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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/777,876	02/07/2001	Arnaud Gueguen	202888US2	4116
22850	7590	10/28/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			DEPPE, BETSY LEE	
			ART UNIT	PAPER NUMBER
			2637	

DATE MAILED: 10/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/777,876

Applicant(s)

GUEGUEN, ARNAUD

Examiner

Betsy L. Deppe

Art Unit

2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-12,25 and 26 is/are rejected.
- 7) ☒ Claim(s) 8 and 13-24 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-3 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

2. The drawings were received on 16 July 2004. Figures 1 and 2 of these drawings are not approved.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "23" has been used to designate both a shift register and an exclusive OR operator. The exclusive OR operator should be designated "22." Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to because "MULTIPLEXOR" in Figure 1 should be "MULTIPLEXER" and "DEMUTIPLEXOR" in Figure 2 should be "DEMUTIPLEXER." Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The

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abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The abstract of the disclosure is objected to because it contains the form and legal phraseology (e.g. "comprises" on lines 1 and 3) often used in patent claims.

Correction is required. See MPEP § 608.01(b).

7. The disclosure is objected to because of the following informalities:

on page 13 of the substitute specification, "23" on the last line should be deleted if the exclusive OR operator "23" in Figure 1 is changed to "22" (see drawing objection above);

on page 16, line 5, "o" should be "of". Appropriate correction is required.

Claim Objections

8. The claims are objected to because they lack a proper introduction. The present Office practice is to insist that each claim must be the object of a sentence starting with "I (or we) claim," "The invention claimed is" or the equivalent. See MPEP § 608.01(m).

Although the applicant indicated on page 15 of the amendment/remarks that a proper introduction has been included, neither the amended claims nor the substitute specification include an introduction.

9. The claims are objected to because of the following informalities:
- a. in claim 1, line 4, the second occurrence of “a useful” should be “the useful”;
 - b. in claim 1, line 25, the Examiner suggests inserting “respective” before “set of weighted output information items” since there are a plurality of “weighted output information items” that correspond to each of a plurality of elementary decoding steps;
 - c. in claim 1, line 27, “said threshold quantity” should be “a threshold quantity”;
 - d. on line 5 of claims 3 and 4, it appears that “said set of weighted output information items” should be “each set of said weighted output information items” in order to be consistent with claim 1, lines 22-23;
 - e. in line 5 of claims 6, 10-12 and line 4 of claim 7, respectively, “a threshold quantity” should be “the threshold quantity”;
 - f. in claim 8, lines 4-5, the Examiner suggests changing “calculating using an adaptive algorithm” to “using an adaptive algorithm to calculate” for improved readability;
 - g. in claim 9, lines 5-6, the Examiner suggests changing “selecting, using a pre-established reference table,” to “using a pre-established reference table to select” for improved readability;

- h. in claims 14-16 and 18-10, all occurrences of "quantity" should be "quantity characteristic" in order to be consistent with the terminology in claim 13, lines 6 and 10;
- i. in claim 17, line 3, "as" should be "is" and "quantities" should be "quantity characteristics"; and
- j. in claim 18, line 4, the Examiner suggests changing "selecting using a pre-established reference table" to "using a pre-established reference table to select" for improved readability.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what is meant by "quantity used" on line 6.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US Patent No. 6,615,385 B1 cited in the Office Action mailed April 16, 2004) in view of Yi (US Patent No. 5,907,582).

14. With regard to claim 1, Figures 1 and 3 of Kim et al. discloses the claimed invention including (a) an iterative decoding comprising a plurality of elementary decoding steps (120 and 150 in Figure 1) associated with interleaving and deinterleaving steps wherein each of the elementary decoding steps receive a set of information and generates a set of weighted output information items; (b) generating a characteristic quantity from each set of weighted output items generated by each of said elementary decoding steps (see column 5, lines 9-11); (c) comparing said characteristic quantity to a threshold quantity (see step 340 and 360 in Figure 3); and (d) interrupting said decoding when said characteristic quantity (i.e. the errors determined using CRC) reaches the threshold quantity (see step 390 in Figure 3). (See also column 5, line 62 – column 6, line 35)

However, Kim et al. does not teach the recited coding step and the plurality of elementary decoding steps corresponding to a plurality of elementary coding steps associated with at least one interleaving step. Yi discloses a system with a turbo code encoder in Figure 3 and an iterative Turbo decoder in Figure 6 wherein the elementary decoding steps correspond to the plurality of coding steps. (See also column 8, line 21- column 9, line 26 and column 12, lines 14-46) Since Kim et al. does not provide details of the Turbo encoder, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the receiver of Kim et al. in a communication

system with the transmitter/encoder of Yi in order to recover turbo coded data without incurring undue processing delay (see Kim et al. column 2, lines 7-10).

15. With regard to claim 26, Kim et al. in view of Yi discloses the claimed invention including a puncturing step in the coding step and a corresponding depuncturing step in the decoding step. (See Yi, figures 3 and 6; column 9, lines 1-26; and column 12, line 37-43) It would have been obvious to one of ordinary skill in the art at the time the invention was made to also implement the puncturing and depuncturing taught by Yi into the method disclosed by Kim et al. in view of Yi in order to provide greater flexibility in the code rate by enabling a change in the turbo rate without modifying the encoders.

16. Claims 2-5 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. as applied to claim 1 above, and further in view of Haller et al. (US Patent No. 6,182,261 B1).

17. With regard to claim 2, Kim et al. discloses the claimed invention except for calculating a quantity characteristic of a set of extrinsic information. Haller et al. teaches calculating a quantity characteristic (i.e. LLR) of a set of extrinsic information. (See column 10, lines 48-51) It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate a quantity characteristic (i.e. LLR) of a set of extrinsic information in Kim et al. in order to accurately decode the data by assessing the reliability of the information.

18. With regard to claim 3, Kim et al. discloses the claimed invention except for calculating a statistical quantity characteristic of the set of weighted output information

items. Haller et al. teaches calculating a statistical quantity (i.e. LLR) of a set of weighted output information items. (See column 10, lines 29-39) It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate a statistical quantity characteristic of the set of weighted output information items in Kim et al. in order to accurately decode the data by assessing the reliability of the information.

19. With regard to claim 4, Kim et al. in view of Haller et al. discloses the claimed invention except for calculating a means of an absolute value. Since Haller et al. discloses using an absolute value of probability values (see column 10, lines 29-33) or calculating an average or median of probability bits (see column 10, lines 56-58), it would have been obvious to one of ordinary skill in the art at the time the invention was made to also calculate the average/means of the absolute value in order simplify calculations by using only the absolute value while obtaining an accurate assessment of the probability bits over time.

20. With regard to claim 5, Kim et al. in view of Haller et al. discloses the claimed invention including interrupting the decoding procedure when the characteristic quantity is greater than the threshold quantity. (See Haller et al. column 10, lines 39-45) It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the conditions for stopping iterative decoding as disclosed by Haller et al. into the method taught by Kim et al. in order to provide greater flexibility in determining when to stop the iterative decoding and to avoid iteratively decoding the

received data when the received data is of sufficient quality but not necessarily error-free, as required by the method in Kim et al.

21. With regard to claim 25, Kim et al. in view of Haller et al. discloses the claimed invention including the inputs and outputs of elementary decoding steps being weighted, in terms of probabilities, likelihood ratios or log likelihood ratios. Since Haller et al. discloses that iterative decoding techniques use LLR probabilities and soft data from former iterations (see Haller et al. column 1, line 56 - column 2, line 10), it is implicit that the inputs and outputs of the decoders in Kim et al. are weighted, in terms of probabilities, likelihood ratios or log likelihood ratios

22. Claims 6, 9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. in view of Yi as applied to claim 1 above, and further in view of Zhang et al. (US Patent No. 6,233,709).

23. With regard to claim 6, Kim et al. in view of Yi discloses the claimed invention except for determining the threshold quantity as a function of at least one configuration parameter. Zhang et al. teaches varying a threshold quantity (e.g. the number of iterations) as a function of at least one configuration parameter based on a quality of service (QoS) requirements. (See column 1, lines 61 - column 2, line 13 and column 3, lines 46-63) It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the teaching of Zhang et al. into the method disclosed by Kim et al. in view of Yi in order to provide greater flexibility and to ensure quality of service in a changing environment without any unnecessary processing delays.

24. With regard to claim 9, Kim in view of Yi and Zhang et al. discloses the claimed invention including selecting, using a reference table, the threshold quantity. (See Zhang et al. column 2, lines 9-14 and column 3, lines 58-63)

25. With regard to claims 11 and 12, Kim et al. in view of Yi and Zhang et al. discloses the claimed invention except for determining the threshold quantity as a function of mean transmission time or mean energy consumption. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use different factors for determining the threshold quantity based on system requirements. The applicant has not disclosed that using a mean transmission time or mean energy consumption provides an advantage, is used for a particular purpose or solves a stated problem. Therefore, one of ordinary skill in the art would have considered different factors that affect the accuracy of data recovery and meet system requirements when determining the threshold quantity of the circuit disclosed by Kim et al. in view of Yi and Zhang et al.

26. Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. in view of Yi and Zhang et al. as applied to claim 6 above, and further in view of Siemens (WO 99/11009).

27. With regard to claim 7, Kim et al. in view of Yi and Zhang et al. disclose the claimed invention except for at least one of the recited configuration parameters. Siemens discloses that the signal to noise ratio affects a quantity threshold (i.e. the number of iterations) for a given quality of service criterion. (See page 11, lines 16-24)

Since Kim et al. in view of Yi and Zhang et al. discloses varying quantity threshold based on quality of service requirements (see Zhang et al. column 1, line 66 - column 2, line 6), it would have been obvious to one of ordinary skill in the art at the time the invention was made to use signal-to-noise ratio instead of the bit error rate to adjust the quantity threshold since they are both indicators of signal quality. Selecting an indicator of signal quality for adjusting the quantity threshold depends upon system considerations such as whether one is easier to determine or simplifies the circuit.

Furthermore, the applicant has not disclosed that any of the recited configuration parameters provides an advantage, is used for a particular purpose or solves a stated problem. Therefore, one of ordinary skill in the art would have considered different configuration parameters, including signal-to-noise ratio as disclosed by Doetsch et al., that affect the accuracy of data recovery when determining the threshold quantity of the circuit disclosed by Kim et al. in view of Yi and Zhang et al.

28. With regard to claim 10, Kim et al. in view of Yi and Zhang et al. disclose the claimed invention except for selecting the threshold quantity based in part on a complexity of the decoding. Doetsch et al. discloses varying a quantity threshold (i.e. the number of iterations) based on coding complexity. (See page 11, lines 12-16) Since decoding complexity corresponds to coding complexity, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the threshold quantity in Kim et al. in view of Yi and Zhang et al. based on the decoding complexity in order to provide greater flexibility and for accurate data recovery without requiring unnecessary processing delays.

Allowable Subject Matter

29. Claims 8 and 13-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

30. The following is a statement of reasons for the indication of allowable subject matter: prior art of record does not teach or suggests in combination a digital transmission comprised of a determining step that includes the step recited in claims 8 and 13, respectively.


Conclusion

31. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Berens et al. (US Patent No. 6,272,183 B1) is the English language equivalent to Doetsch et al. (WO 99/11009) that was used in the rejection of claims in the preceding paragraphs.

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Betsy L. Deppe whose telephone number is (571) 272-3054. The examiner can normally be reached on Monday, Wednesday and Thursday (8:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272 - 2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Betsy L. Deppe
Primary Examiner
Art Unit 2637

BLD